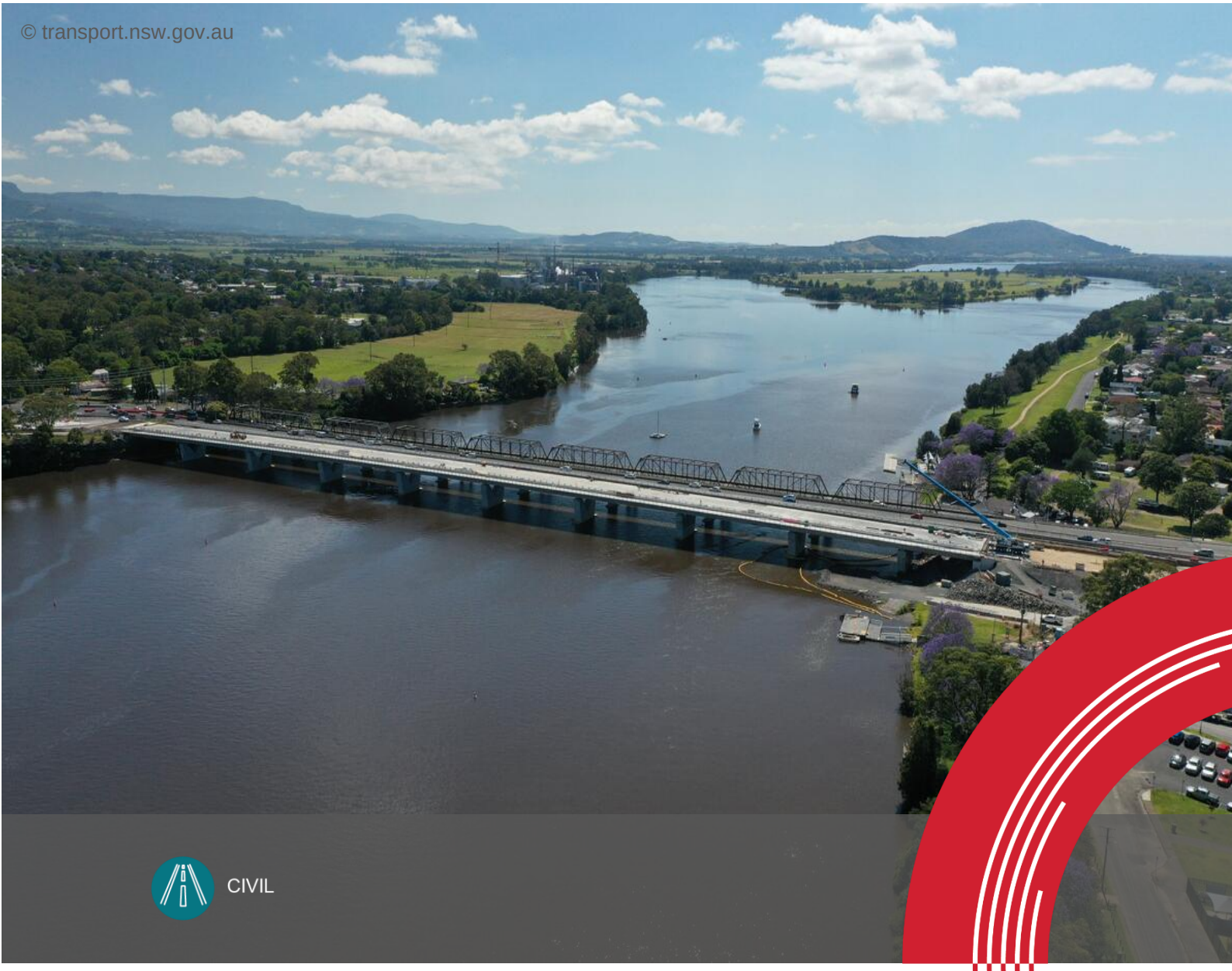

CIVIL

Water Cycle Management Plan

for

Bomaderry BTR at 53 & 57 Bolong Road & 4 Beinda Street, Bomaderry

for Landcom

Report Document Control

Project: Bomaderry BTR at 53 & 57 Bolong Road

Project Ref: SY232949

File Name: 232949_Water_Cycle_Mgmt.docx

Client: Landcom

Title: Water Cycle Management Plan

Table 1 - Revision History

Revision	Report Status	Issue Date	Prepared	Reviewed	Admin
1.0	Issued for Review	09/04/2024	BS	RS	-
2.0	Issued for Approval	17/04/2024	BS	DH	

Prepared:

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Reviewed:

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Contents

1. Introduction

Northrop Consulting Engineers Pty Ltd were engaged by Landcom to undertake detailed civil and stormwater design and documentation of the proposed development located at 53 & 57 Bolong Road and 4 Beinda Street, Bomaderry. (Lot 1-7 in DP 25566, Lot 1 in DP 329959). This report accompanies, and should be read in conjunction with, drawings SY232949 C1.01 – C6.01.

The purpose of this report is to summarise the proposed design solutions for the stormwater management for the Development Application submission to Council. The proposed design has been considered with regard to Shoalhaven City Council DCP 2014, Shoalhaven City Council Engineering Design Specification as well as industry best practice.

We note the information contained in this report is not intended to present detailed design solutions but rather provide solutions commensurate with a conceptual design suitable for Development Application assessment.

2. Site Description

The subject site is bound by Beinda Street frontage to the north, Bolong Road frontage to the east, existing residential properties to the south and an industrial lot to the west. Figure 1 below shows the development extent as well as the locality of the site.

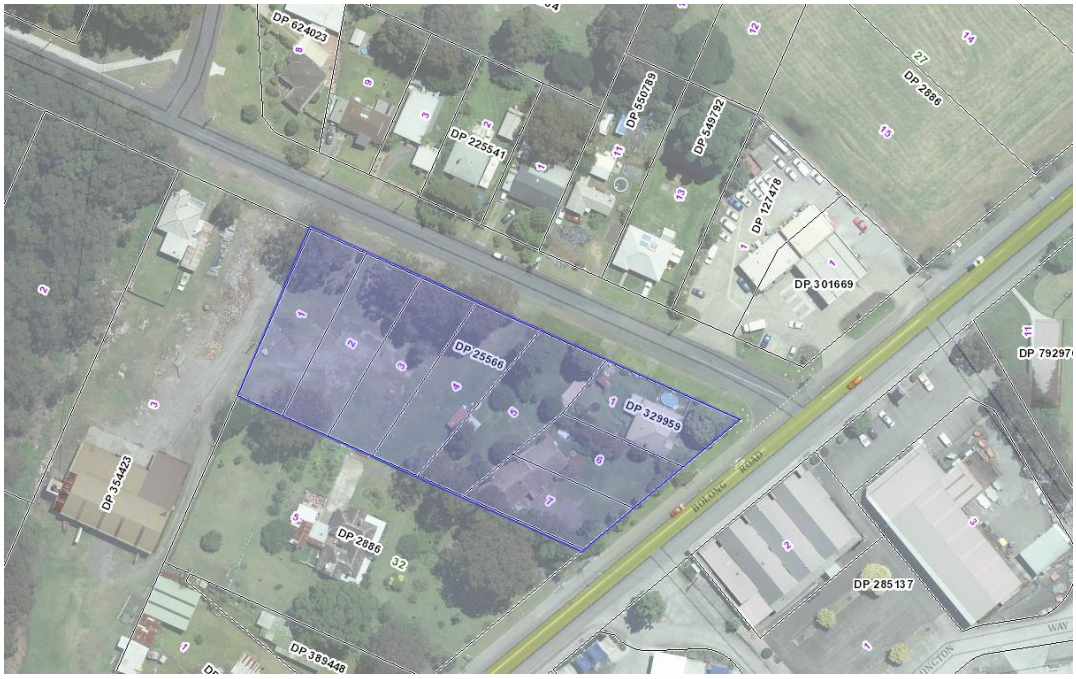

Figure 1 – Site Aerial Image – Obtained from maps.six.nsw.gov.au.

The proposed site is currently comprised of three lots with residential dwellings and associate structures, and the remaining 5 lots are vacant with previous use as a sawmill.

In its current state, the site is approximately 7% impervious. The topography slopes from the north-west corner to the south-east corner. Surface levels range between 11.0m to 5.0m AHD.

Based on geotechnical report prepared by Stantec (Report Ref 34001019-GI-R001) the soil profile is believed to consist of a layer topsoil/fill material over sandstone bedrock.

3. Proposed Development

The proposed development comprises of two multi-storey buildings with parking and two vehicle access points from Beinda Street. The development contains a number of residential apartments and the ground floor of each building having vehicle parking.

The building footprint is approximately 3,203m^2 with approximately 2,708m^2 of ground floor landscaping.

The layout of the proposed development can be seen within the architectural drawings and within drawings SY232949 C1.01 – C6.01.

4. Proposed Stormwater Management Strategy

4.1 General Strategy

The proposed development will incorporate a number of devices and measures aimed at providing adequate and responsible management of stormwater runoff and flooding.

In line with Chapter G2 of Shoalhaven City Council DCP the conceptual stormwater management strategy has considered the following items which will be discussed in the following sections of this report:

- Water conservation;
- Stormwater Retention;
- Nutrient and Pollution Control;
- Onsite Detention;
- Local Overland Drainage;
- Flooding.

4.3 Stormwater Harvesting

The intent of water retention targets is to mimic the natural catchment hydrology from all development sites, in terms of:

- Quantity - the annual volume of stormwater reaching natural creeks and waterways;
- Rate - the peak flow rates leaving the site; and
- Response - the time it takes for rain to runoff the site.

Shoalhaven City Councils DCP Chapter G2 section 5.2.2 requires adequate retention storage where there is an increase in impervious surface area. To satisfy councils performance criteria P7 the minimum volume of the retention storage is based on the following:

- [A] Storage Depth (DCP Chapter G2, Table 2: retention storage depth) =9mm
- [B] Increase in impervious surface area compare to pre-development =3606m^2
- retention Storage Volume = [A] x [B] = 33m^3
  Adopted volume = 42m^3

The harvested stormwater is intended to be used for irrigation and toilet flushing. The following describes how the re-use rates for irrigation and toilet flushing were determined.

The irrigation re-use rate applied to the rainwater tank is an industry standard of 0.4kL/year/m^2. The development has a total of 2,072m^2 of landscaped area which generates a reuse rate of 829kL/year The internal re-use rate was determined from NSW MUSIC Modelling Guidelines 2015, Table 6.2. The development comprises of 25 single-bedroom units, 33 two-bedroom units and 2 three-bedroom units. Using this information and the demand rates from Table 6.2 the internal re-use rate for toilet flushing is 2.614kL/day.

4.4 Nutrient and Pollution Control

To minimise adverse impacts upon the ecology of downstream watercourses, stormwater treatment devices have been incorporated into the design of the development. The adopted nutrient and pollution targets were taken from Green star performance targets and Shoalhaven City Councils DCP Chapter G2 section 5.2.3, these targets are summarised in Table 1:

Table 1 - Nutrion and Pollution Control Summary

Pollutant Criteria	Post Development Average Annual Load Reduction
Gross Pollutants	• 90% • Litter: Retention of litter greater than 40mm for flows up to the 4 exceedances per year (EY) event (3-month ARI peak flow). • Coarse sediment: Retention of sediment coarser than 0.125mm for flows up to the 4EY peak flow.
Total Suspended Solids (TSS)	• 85%
Total Phosphorous (TP)	• 65%
Total Nitrogen (TN)	• 45%

The performance of the proposed stormwater management strategy was assessed against these targets using the conceptual design software MUSIC (Version 6). The MUSIC model was developed using parameters recommended in the document “NSW MUSIC Modelling Guidelines” (WBM, 2015).

The total catchment area was split into sub-catchments representing the areas draining to the different treatment devices. A schematic of the MUSIC model is provided in Figure 2.

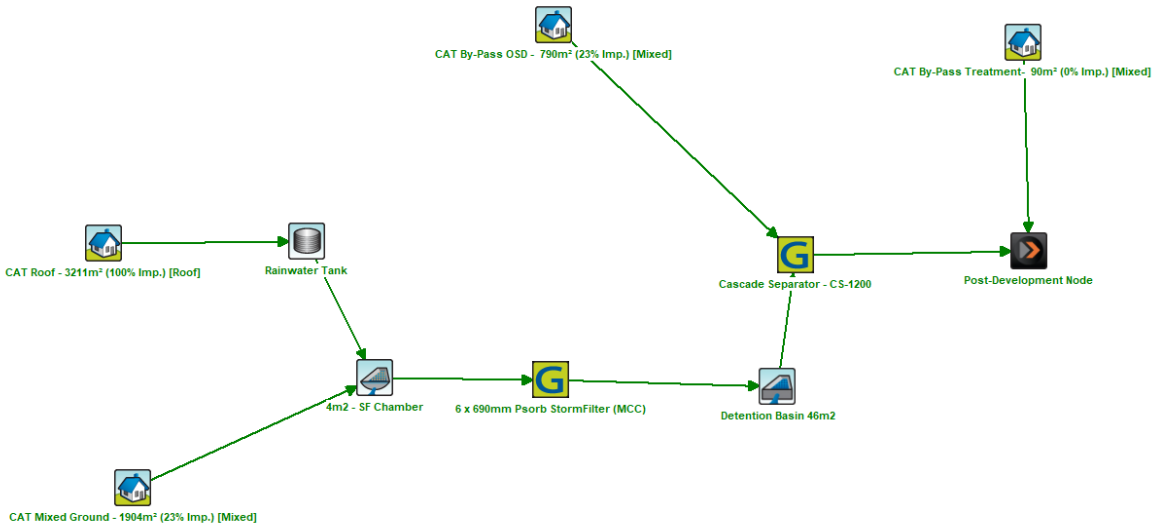

Figure 2 - Music Model Schematic

A number of factors were identified to select the most appropriate stormwater quality improvement devices (SQIDs). The proposed development footprint and usage was considered especially significant to this design which eliminated a number of effective treatment options. In addition to the practical constraints, maintenance, operability, and aesthetics were considered.

The following is a summary of the water quality treatment devices that have been utilised in the proposed treatment train.

- **Rainwater Retention Tank** – Runoff from roof areas is to be directed to a rainwater Retention tank. The tank is to be fitted with a proprietary first-flush device which will effectively remove dead insects, bird and animal droppings and concentrated tannic acids from the stormwater system. The

rainwater tank will also provide secondary treatment by acting as an initial sediment trap, collecting suspended solids and nutrients attached to those sediments. The volume collected in the Retention tank is to be reused as described previously in this report.

- **Proprietary filtration units** – Overflow from the rainwater tank and run-off collected via stormwater pits throughout the site is directed to the below ground detention tank with an internal water quality chamber where multiple filtration units are to be installed. The self-cleaning, media-filled cartridges absorb and retain pollutants such as suspended solids, hydrocarbons, and nutrients.
- **Detention Storage** –The water quality chamber has an internal weir where the overflow enters the detention storage section on the below ground tank, this also assists to collect gross pollutants and sediments captured in the stormwater runoff.
- **Proprietary GPT** – Surface runoff that bypasses the detention storage tank will be collected via stormwater pits and directed towards the proprietary GPT unit. The GPT will capture and retain hydrocarbons, trash, and debris.

The reductions outlined in Table 2 are achieved using these devices, thus meeting council requirements.

Table 2 - Music Model Result Summary

Pollutant Criteria	Reduction Target (%)	Sources (kg/yr)	Residual Load (kg/yr)	Achieved Reduction (%)
Total Suspended Solids (TSS)	85	282	33.4	88.0
Total Phosphorous (TP)	65	0.902	0.28	67.9
Total Nitrogen (TN)	45	10	3.64	61.1
Gross Pollutants	90	101	0.38	99.6

Based on the results shown in the table above, the proposed water quality treatment system will meet the design intent and reduction targets. An electronic copy of the MUSIC model can be provided to council upon request.

4.5 Onsite Detention

In accordance with Shoalhaven City Councils DCP Chapter G2, on-site detention will be required to be investigated to limit post development flows from the proposed development site to less than or equal to pre-development flows for all storm events up to and including the 1% AEP storm event. Runoff from the proposed development was modelled using the runoff routing software DRAINS incorporating an on-site detention facility. This was compared to the pre-developed site in its existing state with an impervious percentage of 7%.

The ILSAX hydrological model in DRAINS was used to generate runoff hydrographs for the pre-developed and post-developed site. Data from the Bureau of Meteorology (BOM) was used to generate design storms obtained from the ARR2016 Data Hub. Runoff parameters were selected to replicate the site conditions that will be present in the post-developed case and that which currently occur in the pre-developed case.

A summary of parameters used for the model are shown below:

Impervious depression storage		= 1 mm
Pervious depression storage		= 5 mm
Time of concentration:	Pervious	= 10 minutes
	Impervious	= 5 minutes

Soil type = 3.0

Storm durations ranging from 5 minutes to 270 minutes were investigated for each of the design storm events that were analysed for a site area of 5,911m^2.

The post developed site was modelled as a lump sum catchment draining directly to the 85kL OSD tank. The tank has a Ø210mm low flow orifice plate, and a Ø240mm high flow orifice plate, an overflow weir at RL 6.9m, and two Ø375mm outlet pipes, one being a low flow outlet pipe and the second being an emergency overflow outflow pipe. A 796m^2 catchment area was modelled to bypass the OSD system, this was accounted for in the sizing of the OSD tank and the site post development vs pre development flow rate. Further details of the OSD tank configuration can be found on drawings SY232949 C5.01.

A comparison between the pre-development and post-development flows from the site for the critical storm duration for each of the design storm events, up to and including the 1% AEP is presented in Table 3.

Table 3 - Pre vs Post Development Flow Rates

	Annual Exceedance Probability (years)		
	20%	**5%**	**1%**
Pre-development Scenario			
Qpre (m^3/s) - PSD	0.093	0.154	0.238
Post-devevelopment Scenario			
Qpost no OSD (m3/s)	0.149	0.218	0.311
Qpost $_{OSD}$ (m3/s)	0.093	0.150	0.225
Peak OSD storage (m^3)	41.7	61.8	85.1
TWL	6.0	6.4	6.9

As shown in Table 3, the peak post-development flows for storm events up to the 1% AEP have been detained to less than that for the pre-development site. Confirming the OSD provided will achieve the design intent to limit post-development flows to that of the pre-development state.

Shoalhaven City Council DCP, Chapter G2 section 5.1.4, A5.9 allows for 50% of the 42kL retention volume to contribute to the onsite detention volume. The final OSD tank volume is 64.1m^3.

4.6 Local Overland Drainage

Local overland flow paths have been provided along the northern and southern sides of the building. There are no overland flow paths from neighbouring properties entering the site.

4.7 Flooding

A flood certificate was obtained from council which indicates that the site is impacted by flooding. The flood planning level (FPL) was nominated as 6.40m AHD. The lowest habitable floor level is 6.90m AHD. All carpark levels and vehicle crossovers are above the FPL and PMF (7.00m AHD). Further details about regarding the flooding impact on the site refer to separate flood compliance assessment prepared by Northrop dated 09/04/24, revision 1.

5. Operation and Maintenance

Frequent monitoring of the stormwater management devices is fundamental in ensuring the retention and nutrient and pollution management systems are functioning as designed. Regular maintenance is critical to the performance of both the primary and secondary treatment devices proposed in this system.

It is recommended that pollutants collected in GPT's are cleared on a regular basis to ensure optimum water quality treatment is being achieved. Access is also a major factor when considering maintenance operations. This development does include proprietary GPT systems that will require Access from machinery or equipment.

A summary of the items to be considered during monitoring with the associated consequences and recommended actions to be taken is provided below in Table 4. It is recommended that all these inspections be undertaken at three monthly intervals for the first year of operation. Any major problems encountered during this time should be documented and conveyed to the owner to seek appropriate action.

To ensure monitoring is occurring regularly a 'Maintenance Schedule' has been included in Appendix A. The time frames in this schedule should be adopted after the initial twelve months. The schedule details the frequency of inspections and the appropriate remediation steps required to ensure adequate operation of the infrastructure. The schedule is to be implemented upon commissioning of the stormwater management infrastructure and remain in place for the life of the development. A less or more frequent schedule may be able to be adopted after the system is fully established depending on the outcomes of the inspections. It is also recommended that inspections take place as soon as possible after any heavy rain or major storm events.

The items listed in Table 4 have been separated into general site items and device specific monitoring. This summary should be used in conjunction with the Stormwater Maintenance Schedule, whereby the following are considered when carrying out inspections. The general items listed would be visually apparent during day to day activities. If an issue is identified appropriate action should be taken immediately, waiting until the next scheduled monitoring inspection is not advised.

Refer to the manufacturers inspection and maintenance guidelines attached to the rear of this document for detailed information.

Table 4 - Monitoring and Maintenance Summary

Item to be Monitored	Monitoring Task	Purpose of Monitoring	Maintenance Action
General			
Litter (Anthropogenic)	• Check for litter in and around treatment areas and structures.	• Litter can potentially block the inlet and outlet structures resulting in flooding, as well as detract from the system's visual amenity.	• Address source of litter with appropriate action. • Remove litter.

Item to be Monitored	Monitoring Task	Purpose of Monitoring	Maintenance Action
Litter (Organic)	• Check for litter in and around treatment areas.	• Organic litter can provide an additional source of nutrients to the filtration systems. • Accumulated organic matter can also cause offensive odours and can reduce percolation of water into the filter media.	• Address source of organic litter with appropriate action. • Remove litter.
Inlet and Outlet Pits	• Ensure inflow areas and grates over pits are clear of litter and are in good/safe condition. • Check for dislodged or damaged pit covers and ensure general structural integrity.	• If the pits become blocked it is likely to cause the system to not function correctly. • Dislodged or damaged pit covers can be a safety hazard.	• Remove debris and repair any structural damage as required.
DEVICES			
Rainwater Tank	• Check for build-up of sediment	• If sediment accumulates in the rainwater tank, the pump may not function as intended and can contribute to poor reuse water quality.	• If sediment is suspected to be in the tank flush with potable water.
First Flush Devices	• Check for build-up of debris & sediment in device. • Check for damage or blockages.	• Sediment or debris can block outlet preventing device to function as intended.	• Remove debris or sediment as required. • Remove or repair blockages as required.
Proprietary Devices	• Refer to operations and maintenance provided by manufacturer	• If the trash collection chamber becomes full, the GPT will be unable to collect further Gross Pollutants from the site runoff. •	• Refer to operations and maintenance provided by manufacturer

6. Conclusion

The proposed stormwater management design presented above has been prepared to comply with Shoalhaven City Council DCP as well as industry best practice. The design philosophy is based on the principle of at source treatment, to reduce conveyance infrastructure and manage water quantity and quality aspects.

Based on the above, our investigation and concept designs indicate the proposed development can adequately manage and address all items surrounding stormwater runoff. Should you have any queries, please feel free to contact the undersigned on (02) 4226 3333

APPENDIX A – Supplementary Information

- Concept Stormwater Management Plan
- Maintenance Schedule

BOMADERRY BTR

53 & 57 BOLONG ROAD & 4 BEINDA STREET BOMADERRY
CIVIL ENGINEERING PACKAGE

LOCALITY PLAN

APPROXIMATE LOCATION OF SITE

NORTHROP

DRAWING SCHEDULE

DWG No.	DRAWING TITLE
C1.01	COVER SHEET
C2.01	SOIL AND WATER MANAGEMENT PLAN
C2.02	SOIL AND WATER MANAGEMENT DETAILS
C3.01	STORMWATER MANAGEMENT & LEVELS PLAN
C3.10	CIVIL LONG SECTIONS - SHEET 1
C5.01	CIVIL DETAILS - SHEET 1
C6.01	CONCEPT BULK EARTHWORKS PLAN

DRAWN: TIMOTHY SMALL
DESIGNED: BLAYNE SWYER
JOB MANAGER: DANIEL HOLLAND
VERIFIER:

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	ISSUED FOR 50% DEVELOPMENT APPLICATION	TS		BS	02.04.24
B	ISSUED FOR DEVELOPMENT APPLICATION	WD		DH	18.04.24

CLIENT: LANDCOM

DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS VERIFICATION SIGNATURE HAS BEEN ADDED

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ph. 0435 069 899 peter@stclairarchitecture.com
Peter St.Clair NSW ARB 7325

NORTHROP
Wollongong
Level 1, 57 Kembla Street, Wollongong NSW 2500
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Email southcoast@northrop.com.au ABN 81 094 433 100

PROJECT: **BOMADERRY BTR**
53 & 57 BOLONG RD AND
4 BEINDA ST, BOMADERRY

DRAWING TITLE: **INTERNAL CIVIL WORKS**
COVER SHEET

JOB NUMBER: **SY232949**
DRAWING NUMBER: **C1.01**
REVISION: **B**
DRAWING SHEET SIZE = A1

DENOTES INDICATIVE LOCATION OF STOCKPILE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH DETAIL SD4-1 OF THE BLUE BOOK. EXACT LOCATION TO BE COORDINATED ONSITE TO SUIT CONSTRUCTION ACTIVITIES

PROVIDE TEMPORARY CONTRACTORS VEHICULAR ACCESS POINT. CONSTRUCT A STABILIZED SITE ACCESS IN ACCORDANCE WITH DETAIL SD6-14 OF THE BLUE BOOK, OR ALTERNATIVELY PROVIDE A SHAKEDOWN CATTLE GRID' AT THE ENTRANCE POINT TO REDUCE THE LIKELIHOOD OF SEDIMENT BEING TRAFFICKED OFF-SITE.

DENOTES SANDBAG or GEOTEXTILE SOCK FILLED WITH NO FINES GRAVEL PLACED IN INVERT OF GUTTER OR ALONG EDGE OF BITUMEN @ 15m CTS

PROVIDE PIT PROTECTION INSTALLED IN ACCORDANCE WITH DETAILS SD6-11 OR SD6-12 (AS APPROPRIATE) OF THE BLUE BOOK (TYPICAL)

PROVIDE COMBINED SITE/SILT FENCE 'SILTMASTER' OR SIMILAR, INSTALLED IN ACCORDANCE WITH DETAIL SD6-8 OF THE BLUEBOOK.

THE CONTRACTOR SHALL ENSURE COUNCIL ASSETS AND THE UTILITIES ARE PROTECTED AT ALL TIMES. ANY AND ALL DAMAGES TO COUNCIL ASSETS AND/OR UTILITIES SHALL BE REPAIRED BY THE CONTRACTOR TO THE SPECIFICATION OF COUNCIL AND THE UTILITIES AUTHORITY AND AT NO COST TO THE PRINCIPAL OR NORTHROP CONSULTING ENGINEERS.

BEFORE YOU DIG www.byda.com.au

LEGEND

- DENOTES SITE BOUNDARY LINE
- DENOTES COMBINED SITE/SILT FENCE 'SILTMASTER' OR SIMILAR, INSTALLED IN ACCORDANCE WITH DETAIL SD6-8 OF THE BLUEBOOK.
- DENOTES TEMPORARY CONTRACTORS VEHICULAR ACCESS POINT. CONSTRUCT A STABILISED SITE ACCESS IN ACCORDANCE WITH DETAIL SD6-14 OF THE BLUE BOOK OR PROVIDE A SHAKEDOWN CATTLE GRID AT ENTRANCE POINT TO REDUCE LIKELIHOOD OF SEDIMENT BEING TRAFFICKED OFF-SITE
- DENOTES GEOTEXTILE INLET FILTER INSTALLED IN ACCORDANCE WITH DETAIL SD6-12 OF THE BLUE BOOK
- INDICATES MESH & GRAVEL INLET FILTER INSTALLED IN ACCORDANCE WITH DETAILS SD6-11 OF THE BLUE BOOK
- DENOTES SANDBAG or GEOTEXTILE SOCK FILLED WITH NO FINES GRAVEL PLACED IN INVERT OF GUTTER OR ALONG EDGE OF BITUMEN
- DENOTES INDICATIVE LOCATION OF STOCKPILE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH DETAIL SD4-1 OF THE BLUE BOOK
- EXISTING TREE TO BE RETAINED
- EXISTING TREE TO BE REMOVED

SEDIMENT BASIN SIZING CALCULATION

THE SITE SOIL LANDSCAPE AND PRIMARILY CONSISTS OF SANDY SILT, WHICH HAS THE FOLLOWING PROPERTIES (IN ACCORDANCE WITH TABLE C17 OF THE 'BLUE BOOK'.

SITE PARAMETERS	
CONSTRAINT	VALUE
SEDIMENT TYPE	F
SOIL HYDROLOGY GROUP	C
K = SOIL ERODIBILITY (K-FACTOR)	0.034
R = RAINFALL EROSIVITY (R-FACTOR)	2910
S = 2 YEAR, 6 HOUR STORM INTENSITY	11.6mm/hr (BOMADERRY)
LS = SLOPE LENGTH/GRADIENT	1.15 (118m SLOPE @ 4.4% GRADE)
P = EROSION CONTROL PRACTICE (P-FACTOR)	1.3 (TYPICAL)
C = GROUND COVER (C-FACTOR)	1.0 (0% GRASS COVER)
A = DISTURBED AREA	0.592 Ha
SOIL LOSS (m^3/yr)	66.5m^3/Yr
SOIL LOSS (RUSLE METHOD) (tonnes/ha/yr)	146 tonnes/Ha/Yr
EROSION HAZARD (TABLE 4.2 BLUE BOOK)	VERY LOW
TOTAL SITE RUN-OFF IS LESS THAN 150m^3/Yr. BASIN/TANKS NOT REQUIRED.	

SEDIMENT & EROSION CONTROL NOTES

1. ALL WORK IS TO BE CARRIED OUT IN ACCORDANCE WITH RELEVANT ORDINANCES AND REGULATIONS; NOTE IN PARTICULAR THE REQUIREMENTS OF LANDCOMS MANAGING URBAN STORMWATER, SOILS AND CONSTRUCTION' (THE 'BLUE BOOK').
2. INSTALL SEDIMENT PROTECTION FILTERS ON ALL NEW AND EXISTING STORMWATER INLET PITS IN ACCORDANCE WITH EITHER THE MESH AND GRAVEL INLET FILTER DETAIL SD6-11 OR THE GEOTEXTILE INLET FILTER DETAIL SD6-12 OF THE 'BLUE BOOK'.
3. ESTABLISH ALL REQUIRED SEDIMENT FENCES IN ACCORDANCE WITH DETAIL SD6-8 OF THE 'BLUE BOOK'.
4. INSTALL SEDIMENT FENCING AROUND INDIVIDUAL BUILDING ZONES/AREAS AS REQUIRED AND AS DIRECTED BY THE SUPERINTENDENT.
5. ALL TRENCHES INCLUDING ALL SERVICE TRENCHES AND SWALE EXCAVATION SHALL BE SIDE-CAST TO THE HIGH SIDE AND CLOSED AT THE END OF EACH DAYS WORK.
6. THE CONTRACTOR SHALL ENSURE THAT ALL VEGETATION (TREE, SHRUB & GROUND COVER) WHICH IS TO BE RETAINED SHALL BE PROTECTED DURING THE DURATION OF CONSTRUCTION. REFER ARCHITECTS PLANS FOR TREES TO BE KEPT.
7. ALL VEGETATION TO BE REMOVED SHALL BE MULCHED ONSITE AND SPREAD/STOCKPILED AS DIRECTED BY THE SUPERINTENDENT.
8. STRIP TOPSOIL IN AREAS DESIGNATED FOR STRIPPING AND STOCKPILE FOR RE-USE AS REQUIRED. ANY SURPLUS MATERIAL SHALL BE REMOVED FROM SITE AND DISPOSED OF IN ACCORDANCE WITH EPA GUIDELINES.
9. CONSTRUCT AND MAINTAIN ALL MATERIAL STOCKPILES IN ACCORDANCE WITH DETAIL SD4-1 OF THE 'BLUE BOOK' (INCLUDING CUT-OFF SWALES TO THE HIGH SIDE AND SEDIMENT FENCES TO THE LOW SIDE).
10. ENSURE STOCKPILES DO NOT EXCEED 2.0m HIGH. PROVIDE WIND AND RAIN EROSION PROTECTION AS REQUIRED IN ACCORDANCE WITH THE 'BLUE BOOK'.
11. PROVIDE WATER TRUCKS OR SPRINKLER DEVICES DURING CONSTRUCTION AS REQUIRED TO SUPPRESS DUST.
12. ONCE CUT/FILL OPERATIONS HAVE BEEN FINALIZED ALL DISTURBED AREAS THAT ARE NOT BEING WORKED ON SHALL BE RE-VEGETATED AS SOON AS IS PRACTICAL.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR KEEPING A DETAILED WRITTEN RECORD OF ALL EROSION & SEDIMENT CONTROLS ON-SITE DURING THE CONSTRUCTION PERIOD. THIS RECORD SHALL BE UPDATED ON A DAILY BASIS & SHALL CONTAIN DETAILS ON THE CONDITION OF CONTROLS AND ANY/ ALL MAINTENANCE, CLEANING & BREACHES. THIS RECORD SHALL BE KEPT ON-SITE AT ALL TIMES AND SHALL BE MADE AVAILABLE FOR INSPECTION BY THE PRINCIPAL CERTIFYING AUTHORITY AND THE SUPERINTENDENT DURING NORMAL WORKING HOURS

NOTE THAT ORIGINAL DRAWING IS IN COLOUR

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	ISSUED FOR 50% DEVELOPMENT APPLICATION	TS		BS	02.04.24
B	ISSUED FOR DEVELOPMENT APPLICATION	WD		DH	18.04.24

DRAWN TIMOTHY SMALL | DESIGNED BLAYNE SAWYER | JOB MANAGER DANIEL HOLLAND | VERIFIER

CLIENT: LANDCOM

DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS VERIFICATION SIGNATURE HAS BEEN ADDED

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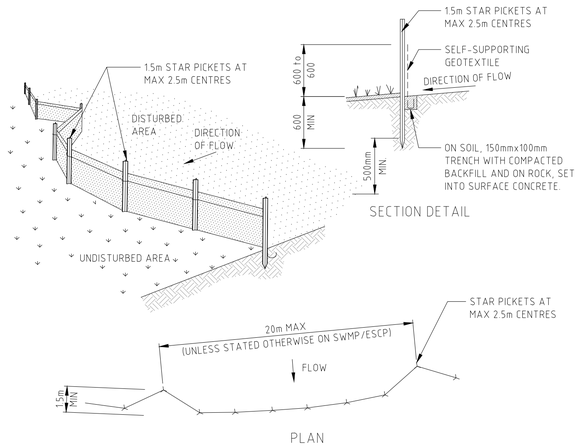
PROJECT: **BOMADERRY BTR**
53 & 57 BOLONG RD AND
4 BEINDA ST, BOMADERRY

DRAWING TITLE: **INTERNAL CIVIL WORKS**
SOIL & WATER MANAGEMENT PLAN

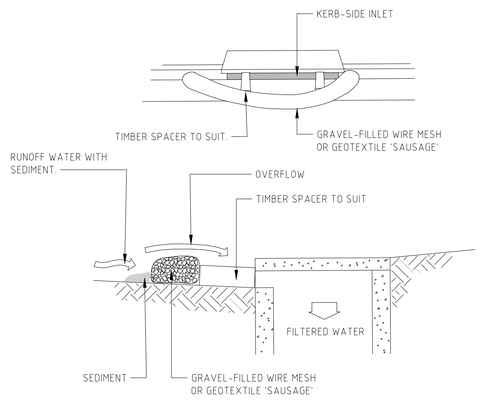
JOB NUMBER: **SY232949**
DRAWING NUMBER: **C2.01**
REVISION: **B**
DRAWING SHEET SIZE = A1



CONSTRUCTION NOTES

1. CONSTRUCT SEDIMENT FENCES AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE, BUT WITH SMALL RETURNS AS SHOWN IN THE DRAWING TO LIMIT THE CATCHMENT AREA OF ANY ONE SECTION. THE CATCHMENT AREA SHOULD BE SMALL ENOUGH TO LIMIT WATER FLOW IF CONCENTRATED AT ONE POINT TO 50 LITRES PER SECOND IN THE DESIGN STORM EVENT, USUALLY THE 10-YEAR EVENT.
2. CUT A 150mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
3. DRIVE 1.5 METRE LONG STAR PICKETS INTO GROUND AT 2.5 METRE INTERVALS (MAX) AT THE DOWNSLOPE EDGE OF THE TRENCH. ENSURE ANY STAR PICKETS ARE FITTED WITH SAFETY CAPS.
4. FIX SELF-SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE POSTS ENSURING IT GOES TO THE BASE OF THE TRENCH. FIX THE GEOTEXTILE WITH WIRE TIES OR AS RECOMMENDED BY THE MANUFACTURER. ONLY USE GEOTEXTILE SPECIFICALLY PRODUCED FOR SEDIMENT FENCING. THE USE OF SHADE CLOTH FOR THIS PURPOSE IS NOT SATISFACTORY.
5. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.
6. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.

SEDIMENT FENCE (SD 6-8)

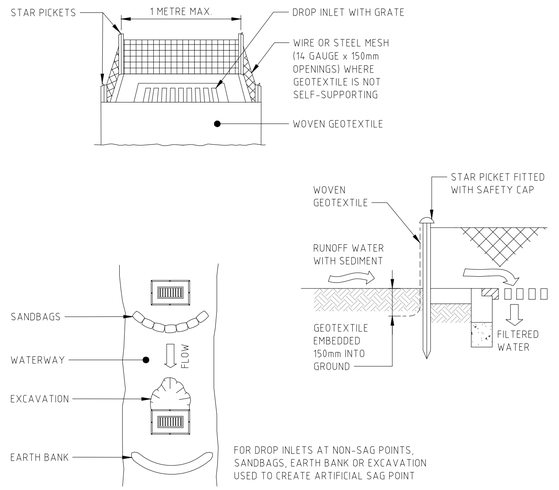


NOTE:THIS PRACTICE ONLY TO BE USED WHERE SPECIFIED IN APPROVED SWMP/ESCP.

CONSTRUCTION NOTES

1. INSTALL FILTERS TO KERB INLETS ONLY AT SAG POINTS.
2. FABRICATE A SLEEVE MADE FROM GEOTEXTILE OR WIRE MESH LONGER THAN THE LENGTH OF THE INLET PIT AND FILL IT WITH 25mm TO 50mm GRAVEL.
3. FORM AN ELLIPTICAL CROSS-SECTION ABOUT 150mm HIGH x 400mm WIDE.
4. PLACE THE FILTER AT THE OPENING LEAVING AT LEAST A 100mm SPACE BETWEEN IT AND THE KERB INLET. MAINTAIN THE OPENING WITH SPACER BLOCKS.
5. FORM A SEAL WITH THE KERB TO PREVENT SEDIMENT BYPASSING THE FILTER.
6. SANDBAGS FILLED WITH GRAVEL CAN SUBSTITUTE FOR THE MESH OR GEOTEXTILE PROVIDING THEY ARE PLACED SO THAT THEY FIRMLY ABUT EACH OTHER AND SEDIMENT-LADEN WATERS CANNOT PASS BETWEEN.

MESH AND GRAVEL INLET FILTER (SD 6-11)

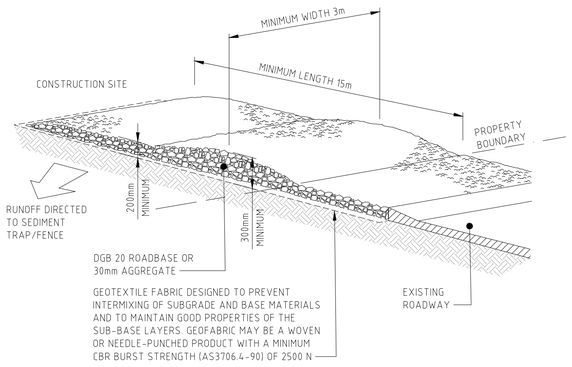


FOR DROP INLETS AT NON-SAG POINTS, SANDBAGS, EARTH BANK OR EXCAVATION USED TO CREATE ARTIFICIAL SAG POINT.

CONSTRUCTION NOTES

1. FABRICATE A SEDIMENT BARRIER MADE FROM GEOTEXTILE OR STRAW BALES.
2. FOLLOW STANDARD DRAWING 6-7 AND STANDARD DRAWING 6-8 FOR INSTALLATION PROCEDURES FOR THE STRAW BALES OR GEOFABRIC. REDUCE THE PICKET SPACING TO 1 METRE CENTRES.
3. IN WATERWAYS, ARTIFICIAL SAG POINTS CAN BE CREATED WITH SANDBAGS OR EARTH BANKS AS SHOWN IN THE DRAWING.
4. DO NOT COVER THE INLET WITH GEOTEXTILE UNLESS THE DESIGN IS ADEQUATE TO ALLOW FOR ALL WATERS TO BYPASS IT.

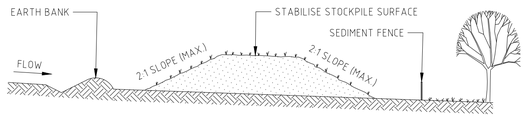
GEOTEXTILE INLET FILTER (SD 6-12)



CONSTRUCTION NOTES

1. STRIP THE TOPSOIL, LEVEL THE SITE AND COMPACT THE SUBGRADE.
2. COVER THE AREA WITH NEEDLE-PUNCHED GEOTEXTILE.
3. CONSTRUCT A 200mm THICK PAD OVER THE GEOTEXTILE USING ROAD BASE OR 30mm AGGREGATE.
4. ENSURE THE STRUCTURE IS AT LEAST 15 METRES LONG OR TO BUILDING ALIGNMENT AND AT LEAST 3 METRES WIDE.
5. WHERE A SEDIMENT FENCE JOINS ONTO THE STABILISED ACCESS, CONSTRUCT A HUMP IN THE STABILISED ACCESS TO DIVERT WATER TO THE SEDIMENT FENCE.

STABILISED SITE ACCESS (SD 6-14)



CONSTRUCTION NOTES

1. PLACE STOCKPILES MORE THAN 2m (PREFERABLY 5m) FROM EXISTING VEGETATION, CONCENTRATED WATER FLOW, ROADS AND HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS LOW, FLAT, ELONGATED MOUNDS.
3. WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2m IN HEIGHT.
4. WHERE THEY ARE TO BE IN PLACE FOR MORE THAN 10 DAYS, STABILISE FOLLOWING THE APPROVED ESCP OR SWMP TO REDUCE THE C-FACTOR TO LESS THAN 0.10.
5. CONSTRUCT EARTH BANKS (STANDARD DRAWING 5-5) ON THE UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES AND SEDIMENT FENCES (STANDARD DRAWING 6-8) 1 TO 2m DOWNSLOPE.

STOCKPILES (SD 4-1)

DRAWN TIMOTHY SMALL DESIGNED BLAYNE SWYER JOB MANAGER DANIEL HOLLAND VERIFIER

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	ISSUED FOR 50% DEVELOPMENT APPLICATION	TS		BS	02.04.24
B	ISSUED FOR DEVELOPMENT APPLICATION	WD		DH	18.04.24

CLIENT: LANDCOM

DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS VERIFICATION SIGNATURE HAS BEEN ADDED

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PROJECT: **BOMADERRY BTR**
53 & 57 BOLONG RD AND
4 BEINDA ST, BOMADERRY

DRAWING TITLE: **INTERNAL CIVIL WORKS**
SOIL AND WATER MANAGEMENT
DETAILS

JOB NUMBER: **SY232949**
DRAWING NUMBER: **C2.02**
REVISION: **B**
DRAWING SHEET SIZE = A1

3% GRADE FROM BACK OF KERB TO PROPERTY BOUNDARY PER COUNCIL GUIDELINES

EXISTING VEHICLE CROSSING TO BE DEMOLISHED AND REMOVED OFF SITE. REINSTATE K&G.

DENOTES OVERFLOW FROM SURCHARGE PIT

DENOTES RHS OR SIMILAR TO BE INSTALLED AT BASE OF PLANTER TO ALLOW OVERLAND SURFACE FLOW TO DRAIN TOWARDS STREET FRONTAGE (TYPICAL).

DENOTES OCEAN PROTECT CASCADE SEPARATOR (CS-1200) OR APPROVED EQUIVALENT

PROPOSED GRP FOOTPATHS TO BE RAISED OFF THE GROUND AND ALLOW OVERLAND FLOW PASS UNDERNEATH.

50mm FALLS THROUGH CARPARK TO STORMWATER GRATES (TYPICAL)

PROPOSED PLANTER BOX RETURN BEFORE PROPOSED PIT.

2x375ø OUTLET PIPES. EMERGENCY OUTLET IL = 6.525 OUTLET IL = 5.05

50mm FALLS THROUGH CARPARK TO STORMWATER GRATES (TYPICAL)

3x7kL ABOVE GROUND RAINTWATER TANKS. DETAILS TO BE PROVIDED BY HYDRAULIC ENGINEER AT DETAILED DESIGN STAGE (TYPICAL)

PROPOSED RW DUE TO STEEP GRADES BETWEEN AC CONDENSER ENTRANCE & BOLONG FRONTAGE

EXISTING VEHICLE CROSSING TO BE DEMOLISHED AND REMOVED OFF SITE. REINSTATE K&G.

CONNECT ALL ROOF DOWNPIPES TO RWT TO HYDRAULIC ENGINEERS DETAILS (TYPICAL)

LEGEND

- DENOTES SITE BOUNDARY LINE
- DENOTES PROPOSED BUILDING EXTENTS, REFER TO ARCHITECTURAL & STRUCTURAL DRAWINGS FOR DETAILS
- DENOTES LANDSCAPING EXTENTS, REFER TO LANDSCAPE/ARCHITECTS DRAWINGS FOR DETAILS
- DENOTES PROPOSED RESIDENTIAL VEHICLE ACCESS CROSSING IN ACCORDANCE WITH CITY OF SHOALHAVEN COUNCIL STANDARD DRAWING S104__07
- DENOTES PROPOSED GRP PERMEABLE FOOTPATH SURFACE , REFER TO ARCHITECTURAL DRAWINGS FOR DETAILS
- DENOTES PEDESTRIAN PAVEMENT, REFER TO LANDSCAPE/ARCHITECTS DRAWINGS FOR DETAILS
- DENOTES EXISTING KERB/PAVEMENT/STRUCTURE TO BE DEMOLISHED & DISPOSED OFF SITE, REFER TO ARCHITECTURAL DRAWINGS FOR DETAILS
- FFL6.95 — DENOTES PROPOSED FINISHED FLOOR LEVEL
- PL 7.94 / CL 6.20 — DENOTES PROPOSED FINISHED SURFACE LEVEL / DENOTES PROPOSED COVER LEVEL
- IK 7.94 — DENOTES PROPOSED KERB INVERT LEVEL
- TK 6.20 — DENOTES PROPOSED TOP OF KERB LEVEL
- EX 10.22 — DENOTES EXISTING SURFACE LEVEL
- FALL — DIRECTION OF GRADE
- MC01 — DENOTES ALIGNMENT CONTROL LINE & CHAINAGE, REFER TO LONG SECTION
- CH0.00 — DENOTES PROPOSED STORMWATER PIT NOTE: ON-GRADE PITS ARE TO HAVE GRATES SET ON-GRADE TO MATCH SURFACE GRADING.
- DENOTES EXISTING KERB INLET PIT
- GTD — DENOTES GRATED TRENCH DRAIN
- OSD — DENOTES BELOW GROUND ON-SITE DETENTION TANK, REFER TO DETAIL
- RWT — DENOTES ABOVE GROUND RAINWATER TANKS.
- Ø225 — DENOTES STORMWATER LINE & SIZE. LAID @ 1% MIN LONGITUDINAL GRADE, 300mm MIN COVER.
- DENOTES EXISTING STORMWATER PIPE TO BE RETAINED
- DENOTES OVERLAND FLOW PATH
- DENOTES 1m WIDE GRASS LINED SWALE
- K&G — DENOTES BARRIER KERB & CHANNEL IN ACCORDANCE WITH CITY OF SHOALHAVEN COUNCIL DETAILS
- RW-S — DENOTES RETAINING WALL TO STRUCTURAL ENGINEERS DETAILS

NOTE: PROVIDE SUBSOIL DRAINAGE BEHIND ALL RETAINING WALLS & HYDRAULICALLY CONNECT TO NEAREST DOWNSTREAM STORMWATER PIT (N.S.O.P). REFER TO STRUCTURAL ENGINEERS DRAWINGS FOR DETAILS

- E-OH — DENOTES APPROXIMATE LOCATION OF EXISTING (OVERHEAD) ELECTRICITY LINE
- G — DENOTES APPROXIMATE LOCATION OF EXISTING GAS MAIN
- T — DENOTES APPROXIMATE LOCATION OF EXISTING TELECOMMUNICATION LINE
- W — DENOTES APPROXIMATE LOCATION OF EXISTING WATER MAIN
- S — DENOTES APPROXIMATE LOCATION OF EXISTING SEWER MAIN

LOCATIONS OF EXISTING SERVICES ARE APPROXIMATE ONLY & MAY NOT BE COMPLETE. THE BUILDER IS RESPONSIBLE FOR LOCATING EXISTING INFRASTRUCTURE (CULVERTS, PITS, PIPES, SERVICES, INVERT & COVER LEVELS ETC) PRIOR TO COMMENCING CONSTRUCTION.

THE BUILDER SHALL ALLOW TO MODIFY ALL EXISTING SERVICE COVERS TO MATCH THE NEW PAVEMENTS, IN ACCORDANCE WITH THE RELEVANT AUTHORITIES REQUIREMENTS.

PROVIDE TEMPORARY TRAFFIC CONTROL IN ACCORDANCE WITH STATE & FEDERAL STATUTORY REQUIREMENTS AND LOCAL COUNCIL SPECIFICATIONS/REQUIREMENTS.

NOTE: ALL LEVELS TO AUSTRALIAN HEIGHT DATUM (AHD). ORIGIN OF LEVELS SSM PM 16349, RL 6.721

ALL DESIGN MEASURES SHOWN ON THIS DRAWING HAVE BEEN PREPARED FOR DEVELOPMENT APPLICATION PURPOSES TO DEMONSTRATE FEASIBILITY. ALL DESIGN MEASURES WILL BE SUBJECT TO DETAIL DESIGN AT THE CONSTRUCTION CERTIFICATE STAGE AND MAY BE SUBJECT TO VARIATION PROVIDED THAT THE DESIGN INTENT IS MAINTAINED.

CONCEPT WATERCYCLE MANAGEMENT NOTES:

IN ACCORDANCE WITH CHAPTER G2 SECTION 6.1 OF SCC DCP 2014, THE DEVELOPMENT IS CONSIDERED A LARGE-SCALE DEVELOPMENT, AS SUCH THE DESIGN STRATEGY OF THIS WATER CYCLE MANAGEMENT PLAN IS BASED ON DEMONSTRATED COMPLIANCE AGAINST APPLICABLE STORMWATER TARGETS THROUGH ADOPTION OF COUNCILS DEEMED TO COMPLY CRITERIA.

STORMWATER RETENTION

SITE AREA	= 5911m²
IMPERVIOUS AREA	= 3838m²
FRACTION IMPERVIOUS	= 56%
RETENTION VOLUME REQUIRED	= 0.008x 3606 = 29m³
PROPOSED RETENTION VOLUME	=42m³

THE MINIMUM REQUIRED RETENTION VOLUME OF 29m³ FOR THE DEVELOPMENT HAS BEEN PROVIDED IN THE FORM OF ABOVE GROUND TANKS

STORMWATER QUALITY

SITE AREA	= 5911m²
TREATED ROOF AREA	= 3212m² (100%) TREATED BY RAINWATER TANK AND PROPRIETARY FILTRATION UNITS
TREATED PAVEMENT AREA	= 626m² TREATED BY PROPRIETARY FILTRATION UNITS

ON SITE DETENTION

ON SITE DETENTION FOR THE DEVELOPMENT HAS BEEN ASSESSED USING A RUN OFF ROUTING METHOD USING THE SOFTWARE DRAINS. THE FOLLOWING PARAMETERS WERE USED IN THE DRAINS ANALYSIS:

IMPERVIOUS DEPRESSION STORAGE	= 1mm
PERVIOUS DEPRESSION STORAGE	= 5mm
SOIL TYPE	= 3.0
PRE DEVELOPED FRACTION IMPERVIOUS	= 6%
POST DEVELOPED FRACTION IMPERVIOUS	= 56%
ADOPTED POST DEVELOPED FRACTION IMPERVIOUS IN ACCORDANCE WITH CHAPTER G2, SECTION 5.1.4, A5.2	= 80%
TIME OF CONCENTRATION (PERVIOUS)	= 5mins
TIME OF CONCENTRATION (IMPERVIOUS)	= 10mins
MINIMUM REQUIRED OSD VOLUME	= 85.1m³
ADAPTED OSD VOLUME	= 64.1m³

50% OF THE 42kL RETENTION STORAGE CREDIT APPLIED TO OSD VOLUME IN ACCORDANCE WITH CHAPTER G2, SECTION 5.1.4, A5.9

SITE SPECIFIC RAINFALL DATA WAS DETERMINED USING STATISTICAL DATA OBTAINED FROM THE BUREAU OF METEOROLOGY WEB SITE.

A SUITE OF DESIGN STORM INTENSITIES FOR EVENTS UP TO THE 1% AEP WAS MODELLED. BASED ON THE INPUT DATA ABOVE POST-DEVELOPMENT FLOWS WERE COMPARED TO PRE-DEVELOPMENT FLOWS FOR THE CRITICAL STORM DURATION AND ARE SHOWN BELOW FOR A RANGE OF ARI's.

ARI	PRE DEVELOPED PEAK FLOWS (m³/s)	POST DEVELOPED PEAK FLOWS (m³/s)
100	0.238	0.230
20	0.154	0.0149
5	0.093	0.090

AS CAN BE SEEN FROM THE TABLE ABOVE, THE PROVIDED DETENTION WILL LIMIT THE POST DEVELOPED PEAK FLOWS TO LESS THAN OR EQUAL TO THE PRE DEVELOPED PEAK FLOWS

FLOODING

A FLOOD CERTIFICATE FROM SHOALHAVEN CITY COUNCIL WAS OBTAINED. THE CERTIFICATE IDENTIFIED THE SITE TO BE IMPACTED BY FLOODING.

LOCAL OVERLAND DRAINAGE

OVERLAND FLOW WILL BE CONVEYED ON THE NORTHERN BOUNDARY AND SOUTHERN BOUNDARY AND DIRECTED TOWARDS THE ROAD FRONTAGES.

NOTE THAT ORIGINAL DRAWING IS IN COLOUR

NOT FOR CONSTRUCTION

VERIFIER
JOB MANAGER DANIEL HOLLAND
DESIGNED BLAYNE SAWYER
DRAWN TIMOTHY SMALL

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
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CLIENT: LANDCOM

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PROJECT: **BOMADERRY BTR**
53 & 57 BOLONG RD AND
4 BEINDA ST, BOMADERRY

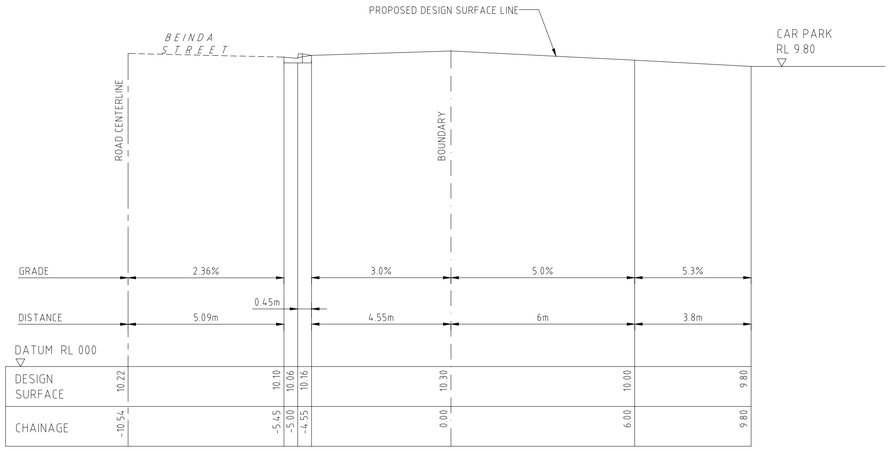
DRAWING TITLE: **INTERNAL CIVIL WORKS STORMWATER MANAGEMENT & LEVELS PLAN**

JOB NUMBER: **SY232949**

DRAWING NUMBER: **C3.01**

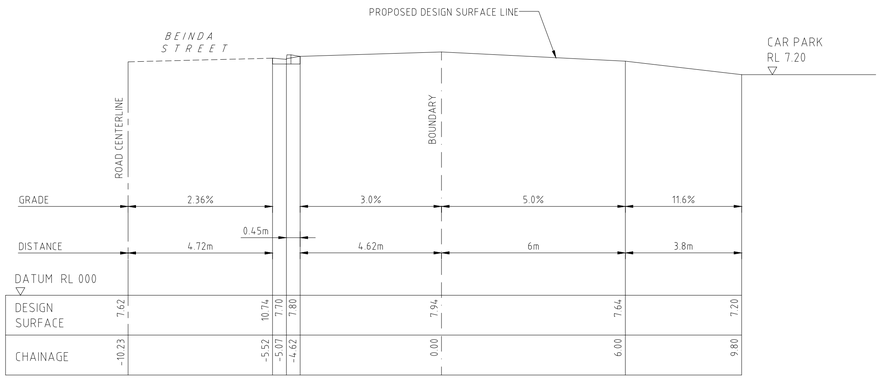
REVISION: **B**

DRAWING SHEET SIZE = A1



DRIVEWAY LONE SECTION MC01 (TOP OF PAVEMENT)

SCALES: VERT 1: 100
HORIZ 1: 100



DRIVEWAY LONE SECTION MC02(TOP OF PAVEMENT)

SCALES: VERT 1: 100
HORIZ 1: 100

DRAWN TIMOTHY SMALL
DESIGNED BLAYNE SAWYER
JOB MANAGER DANIEL HOLLAND
VERIFIER

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
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PROJECT
BOMADERRY BTR
53 & 57 BOLONG RD AND
4 BEINDA ST, BOMADERRY

DRAWING TITLE
INTERNAL CIVIL WORKS
CIVIL LONG SECTIONS
SHEET 1

JOB NUMBER **SY232949**

DRAWING NUMBER **C3.10**

REVISION **B**

DRAWING SHEET SIZE = A1

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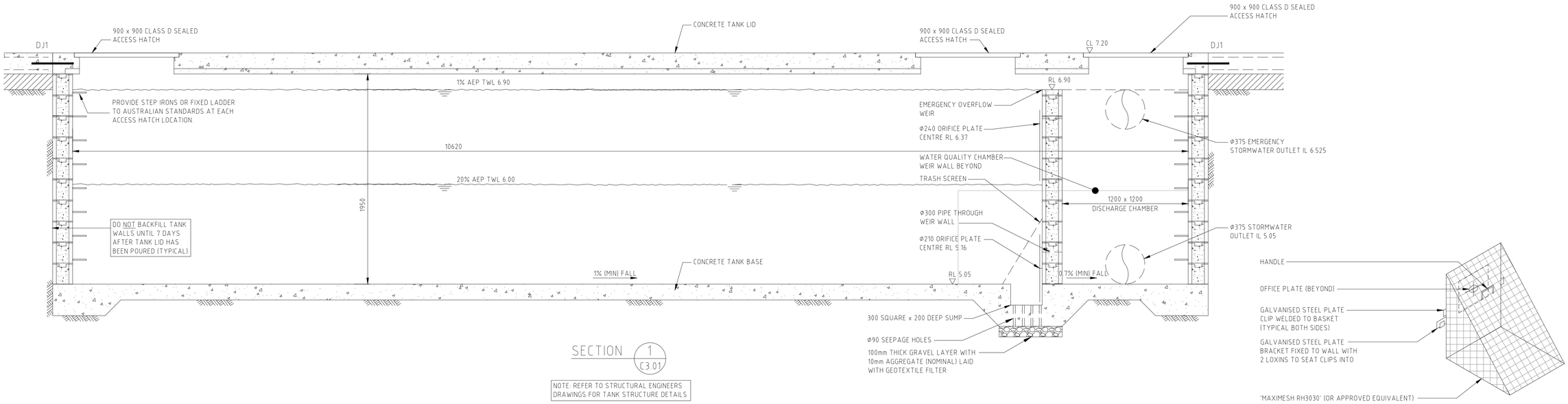
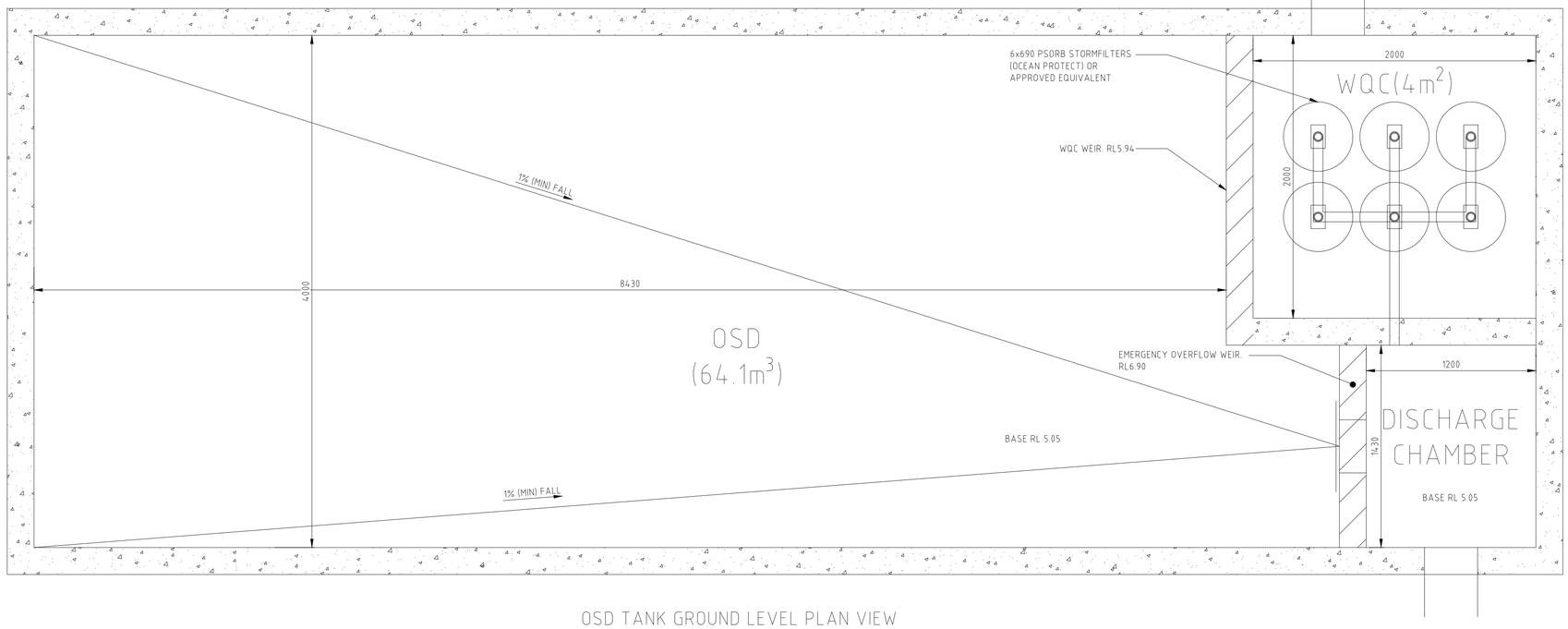


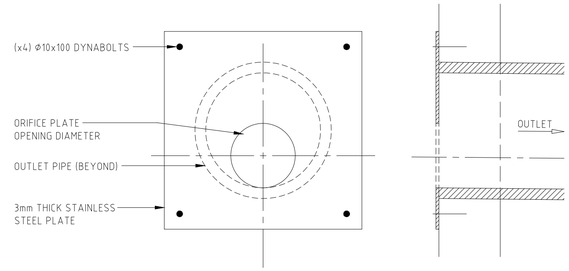
SECTION 1 / C3.01

NOTE: REFER TO STRUCTURAL ENGINEERS DRAWINGS FOR TANK STRUCTURE DETAILS

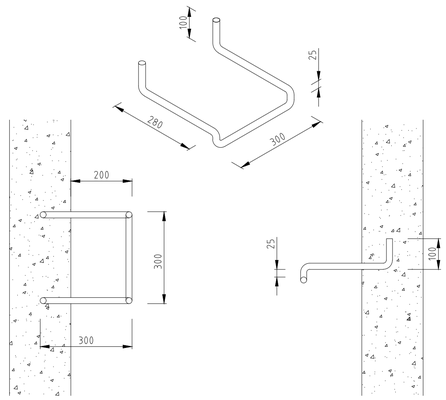
TRASH SCREEN DETAIL



OSD TANK GROUND LEVEL PLAN VIEW



ORIFICE PLATE DETAIL



STEP IRON DETAIL

STEP IRON OF 20mm GALVANISED STEEL MADE TO SHAPE AND DIMENSIONS AS SHOWN, PLACED AT 300 CENTRES AND STAGGERED HORIZONTALLY FOR ALL PITS DEEPER THAN 1.0m. THE USE OF PROPRIETARY STEP IRONS ARE ACCEPTABLE PROVIDED THE PRODUCT IS IN ACCORDANCE WITH AUSTRALIAN STANDARDS

DRAWN: TIMOTHY SMALL
DESIGNED: BLAYNE SWYER
JOB MANAGER: DANIEL HOLLAND
VERIFIER:

NOT FOR CONSTRUCTION

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PROJECT: **BOMADERRY BTR**
53 & 57 BOLONG RD AND
4 BEINDA ST, BOMADERRY

DRAWING TITLE: **INTERNAL CIVIL WORKS**
CIVIL DETAILS
SHEET 1

JOB NUMBER: **SY232949**

DRAWING NUMBER: **C5.01**

REVISION: **B**

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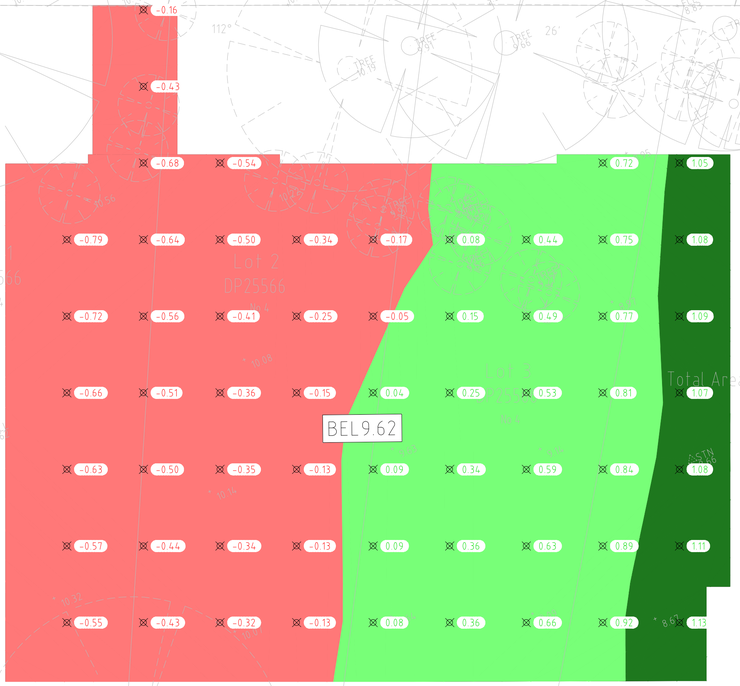

LEGEND

-0.78 — DENOTES DEPTH OF PROPOSED CUT (-VE) OR FILL (+VE)

BEL34.60 — DENOTES BULK EARTHWORKS LEVEL

Surface Analysis: Elevation Ranges

Number	Color	Minimum Elevation (m)	Maximum Elevation (m)	Volume (m^3)
1		-2.000	-1.000	12.9
2		-1.000	0.000	882.2
3		0.000	1.000	882.5
4		1.000	2.000	23.5

BULK EARTHWORKS NOTES

1. BULK EARTHWORKS LEVELS SHOWN ARE BASED ON THE FOLLOWING PAVEMENT THICKNESSES AND ALLOWANCES:
   - STRUCTURAL BUILDING SLAB & TRAFFICABLE CONCRETE PAVEMENT 180mm
2. THE EXISTING GROUND SURFACE WAS LOWERED BY 150mm UNIFORMLY TO ACCOUNT FOR THE REMOVAL OF VEGETATION AND TOP SOIL AS WELL AS DEMOLITION OF EXISTING CONCRETE SLABS AND PAVEMENTS.
   - THIS VOLUME IS ESTIMATED (BASED ON THE TOTAL SITE AREA OF 5911m^2 TO BE APPROXIMATELY 887m^3 (TOPSOIL - CUT)..
3. BULKING FACTORS OF 1.0 WAS USED FOR BOTH CUT AND FILL MATERIAL.
4. THE APPROXIMATE SITE EARTHWORKS VOLUMES BASED ON THE NOTED PAVEMENT THICKNESSES ARE OUTLINED BELOW:
   - CUT: 895m^3
   - FILL: 906m^3
   - NET: 11m^3 (FILL)
5. THE ABOVE VOLUMES ARE TO BE ASSESS NOTING THE FOLLOWING:
   - NO ALLOWANCE HAS BEEN MADE FOR DETAILED EXCAVATIONS SUCH AS FOOTINGS, SET DOWNS, SERVICES TRENCHING, BELOW GROUND TANKS, BATTERS, SEDIMENT BASIN ETC.
   - NO ALLOWANCE HAS BEEN MADE FOR TEMPORARY CONSTRUCTION PLATFORMS OR RETAINING WALL BACK FILL.
   - NO ALLOWANCE HAS BEEN MADE FOR THE REMOVAL OF CONTAMINATED OR UNSUITABLE MATERIAL.
6. THIS PLAN HAS BEEN PREPARED FOR INFORMATION PURPOSES ONLY AND IS INDICATIVE IN NATURE. THE EARTHWORKS CONTRACTOR IS TO VERIFY ALL LEVELS AND QUANTITIES AND PERFORM THEIR OWN BULK EARTHWORKS ASSESSMENT.

DRAWN TIMOTHY SMALL
DESIGNED BLAYNE SAWYER
JOB MANAGER DANIEL HOLLAND
VERIFIER

NOTE THAT ORIGINAL DRAWING IS IN COLOUR

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PROJECT: **BOMADERRY BTR 53 & 57 BOLONG RD AND 4 BEINDA ST, BOMADERRY**

DRAWING TITLE: **BULK EARTHWORKS PLAN**

JOB NUMBER: **SY232949**

DRAWING NUMBER: **C6.01**

REVISION: **A**

DRAWING SHEET SIZE = A1

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53 & 57 Bolong Road & 4 Beinda Street, Bomaderry
Multi Storey Residential Development
Stormwater Maintenance Schedule

Inspected by: .....
Date of Inspection: .....
Next Inspection: .....

Items to be Inspected	Frequency	Performed by	Inspected		Maintenance Needed		Maintenance Procedure	Initial
			Yes	No	Yes	No		
General								
Stormwater surface inlet and junction pits	6 Monthly/ After Major Storm	Owner / Maintenance Contractor					Remove grate and inspect internal walls and base, repair where required. Remove any collected sediment, debris, litter and vegetation. Inspect and ensure grate is clear of sediment, debris, litter and vegetation. Ensure flush placement of grate.	
General inspection of complete stormwater drainage system (that's visible)	6 Monthly	Owner / Maintenance Contractor					Inspect all drainage structures noting any dilapidation, carry out required repairs.	
General inspection of landscaping and batters	3 Monthly	Owner / Maintenance Contractor					Inspect all landscaped batters for scour or erosion. Remove all sediment within drainage system and reinstate batter with soil and established vegetation. Install more scour protection measures if found to be regular occurance.	
Proprietary GPT Unit								
Jellyfish	6 Monthly	Owner / Maintenance Contractor					Inspect unit for level of debris accumulation. Remove collected debris as required until clean once debris reaches manufactures recommended maximum. Inspect filter inserts for structural integrity & repair or replace as required.	
Rainwater Tank / OSD Tank								
Storage Chamber	Anually	Owner / Maintenance Contractor					Inspect rainwater tank storage chamber and remove any build up of sediment or debris found. Flush with portable water.	
Outlet	Anually/ After Major Storm	Owner / Maintenance Contractor					Inspect outlet pipes to ensure in good condition with no deterioration present. If required provide repairs.	
First Flush Diversion	Anually	Owner / Maintenance Contractor					Inspect first flush devices from downpipes/reuse tank and remove any debris or sediment found. Replace device if any damage is found.	

*Note: Refer to manufactures inspection and maitenance guidelines for detailed information.

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